

**COMPACT APPARATUS FOR NONINVASIVE MEASUREMENT OF GLUCOSE
THROUGH NEAR-INFRARED SPECTROSCOPY**

ABSTRACT

A near IR spectrometer-based analyzer attaches continuously or semi-continuously
5 to a human subject and collects spectral measurements for determining a biological
parameter in the sampled tissue, such as glucose concentration. The analyzer
includes an optical system optimized to target the cutaneous layer of the sampled
tissue so that interference from the adipose layer is minimized. The optical system
includes at least one optical probe. Spacing between optical paths and detection
10 fibers of each probe and between probes is optimized to minimize sampling of the
adipose subcutaneous layer and to maximize collection of light backscattered from
the cutaneous layer. Penetration depth is optimized by limiting range of distances
between paths and detection fibers. Minimizing sampling of the adipose layer greatly
reduces interference contributed by the fat band in the sample spectrum, increasing
15 signal-to-noise ratio. Providing multiple probes also minimizes interference in the
sample spectrum due to placement errors.